REMARKS

This is a response to the Office action dated May 30, 2003. Claims 1-21 and 31-33 are pending in the application.

In the Office action, the Examiner stated that the Information Disclosure Statement filed on April 29, 2002 failed to comply with 37 C.F.R. 1.97(c) because it lacked either a statement as specified in 37 C.F.R. 1.97(e) or it lacks the fee set forth in 37 C.F.R. 1.17(p). Furthermore, the Examiner objected to claims 4 and 15 as having informalities. In addition, claims 4 and 15 were rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Further, claims 1, 2, 4, 5, 7, 8, 10, 12, 13, 15, 16, 18, 20, and 31-33 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,750,718 ("Nickel"). Also, claims 1-4, 7, 9, 10, 12-15, 19, 20, 31, and 32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. No. 4,345,749 ("Hellwig") in view of Nickel. Additionally, claims 2, 9, 14, and 19 were rejected under § 103(a) in light of Nickel. Next, claims 6 and 17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nickel in view of U.S. Pat. No. 3,904,300 ("Hetmann"). Finally, claims 11 and 21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Nickel in light of U.S. Pat. No. 4,801,129 ("Wells").

With this response, claims 4 and 15 have been amended. The amendments have been made to overcome the Examiner's objections to the phrase "said at least one mounting end."

Claims 4 and 15 were further amended to overcome Examiner's rejections of these claims under 35 U.S.C. § 112. Applicants believe the amendments now particularly point out and distinctly claim the subject matter, overcoming the rejection.

The remaining rejections from the Office action of May 30, 2003 are discussed below in connection with the various claims. No new matter has been added. Reconsideration of the application is respectfully requested in light of the following remarks.

I. Information Disclosure Statement

Applicants respectfully request consideration of the information disclosure statement filed on April 29, 2002. The Examiner stated in the Office action mailed May 30, 2003 that the above-referenced information disclosure statement failed to comply with 37 CFR 1.97(c) because it lacked either a statement as specified in 37 CFR 1.97(e) or it lacked the fee set forth in 37 CFR 1.17(p). However, Applicants submit that neither a statement nor a fee were required as the information disclosure statement was timely filed under 37 CFR 1.97(b)(3). That section states "(b) An information disclosure statement shall be considered by the Office if filed within any one of the following time periods.... (3) Before the mailing of a first Office action on the merits[.]" Furthermore, section (c) states "An information disclosure statement shall be considered by the Office if filed after the period specified in paragraph (b)...." As indicated in the Office action, the information disclosure statement was filed on April 29, 2002. The first Office action on the merits was mailed November 13, 2002, nearly seven months after the filing of the information disclosure statement at issue. Therefore, the information disclosure statement falls under 37 CFR 1.97(b) and does not require a statement or a fee.

Therefore, Applicants respectfully request that the Examiner review the full disclosure of the documents for her own individual evaluation of their pertinence to the invention claimed.

II. Claim Objections

The Examiner objected to claims 4 and 15 because of informalities and suggested changes to the claims. The suggested changes have been made in this paper. The changes were made to better clarify the invention and no new matter has been added.

Applicants respectfully request that the Examiner withdraw the objections to claims 4 and 15.

III. 35 U.S.C. § 112

Dependent claims 4 and 15 were rejected under 35 U.S.C. §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regards as the invention. Applicants have amended the claims to provide appropriate antecedent basis.

Applicants respectfully request that the Examiner withdraw the rejections of claims 4 and 15.

IV. 35 U.S.C. § 102(b)

a. Independent Claim 1

Independent claim 1 was rejected as being anticipated by Nickel. Claim 1 relates to a variable rate multi-arc leaf spring. The assembly includes a main leaf spring that is constructed of a composite material. The main leaf spring defines upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to

said first radius. The main leaf spring provides a continuous variable spring deformation rate including a soft spring rate and a hard spring rate.

In contrast, Nickel discloses a dual rate spring construction including a main leaf spring 1 and a secondary leaf spring 2. (Col. 2, ll. 26-30). The main leaf spring 1 of Nickel has end portions that are curved upwardly. (Col. 2, ll. 30-31). Nickel, however, does not teach or suggest a configuration for the main leaf spring 1 that by itself provides a continuous variable spring deformation rate, including a soft spring rate and a hard spring rate. To the contrary, Nickel teaches that the secondary leaf spring 2 is necessary to achieve a dual rate response. In particular, Nickel describes that "when a heavy load is encountered, the main spring will deflect downwardly into contact with the pads 6 [mounted in the ends of the secondary springs].... Continued deflection of the main spring will then cause downward deflection of the secondary spring to achieve the dual rate." (Col. 3, ll. 42-48). Thus, Nickel teaches that the deflection of the main spring 1 downward into engagement with the pads 6 on the secondary spring 2 is solely responsible for increasing the spring rate. (Col. 1, ll. 51-55). In other words, deflection of the main spring 1 alone achieves a first rate whereas deflection of the main spring and secondary spring together creates a second non-continuous rate.

Therefore, Applicants respectfully submit that Nickel does not teach every element of claim 1, namely a main leaf spring that provides a continuously variable spring deformation rate. Accordingly, Applicants respectfully request that the Examiner with the rejection of independent claim 1.

b. Independent Claim 12

Independent claim 12 was rejected as also being anticipated by Nickel. Claim 12 relates to a variable rate multi-arc leaf spring assembly. The assembly includes a main leaf spring that is constructed of a composite material. In the absence of any load, the main leaf spring defines an upwardly curved central arc portion having a first radius and at least one pair of upwardly curved peripheral arc portions extending from the center arc portion and having radii not equal to the first radius. Under load conditions, the main leaf spring provides a continuous variable spring deformation rate including a soft spring rate and a hard spring rate. The assembly further includes a load plate mounted beneath the main spring during a predetermined set of payload conditions to enhance the soft spring rate of the main spring.

As discussed above, Nickel fails to teach a main leaf spring that provides a continuously variable spring deformation rate including a soft spring rate and a hard spring rate by way of an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion having radii not equal to the first radius.

Moreover, Nickel fails to teach a load plate mounted beneath the leaf spring wherein the load plate gradually engages the main leaf spring during a predetermined set of payload conditions to enhance said soft spring rate. To the contrary, Nickel teaches a system in which the secondary spring 2 contains pads 6, which, in normal load conditions, "will be spaced out of contact with the lower surface of the main spring 1." (Col. 2, ll. 50-56). Then, when a load is applied, Nickel teaches that the pads 6 will come in contact with

the main spring 1. (col. 3, ll. 42-45). Thus, Nickel teaches that there is an abrupt engagement between the main spring 1 and the secondary spring 2 as the main spring deflects.

Therefore, Applicants respectfully submit that Nickel fails to teach every element of Independent claim 12. More specifically, Nickel not only fails to teach a main leaf spring that provides a continuously variable spring deformation rate including a soft spring rate and a hard spring rate by way of an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion having radii not equal to the first radius, but also fails to teach a system in which a load plate mounted beneath said main leaf spring gradually engages the main leaf spring.

Accordingly, Applicants request that the Examiner withdraw this rejection of independent claim 12.

c. Independent Claim 31

Independent claim 31 was rejected as being anticipated by Nickel. Claim 31 relates to a method of achieving a continuous non-linear variable spring deformation rate for a multi-arc leaf spring assembly. The method includes the steps of providing a main leaf spring defining a central arc portion having a first radius and at least one pair of upwardly curved peripheral arc portions having radii not equal to said first radius; providing a load plate below the main leaf spring; applying a downward force to said main leaf spring, wherein said central arc portion flexes and gradually engages the load plate to achieve a soft spring rate; and applying an increased downward force to the main spring leaf, wherein the central arc portion engages the whole load plate and achieve a hard spring rate with a continuous transition between the soft and hard rates.

As discussed in regard to claims 1 and 12, Nickel alone fails to teach a main leaf spring defining a central arc portion having a first radius and at least one pair of upwardly curved peripheral arc portions having radii not equal to said first radius. Additionally, Nickel fails to teach a load plate beneath said main leaf spring wherein the main leaf spring gradually engages the load plate to achieve an enhanced soft rate.

Therefore, Applicants respectfully submit that Nickel fails to teach every element of claim 31. More specifically, Nickel not only fails to teach a main leaf spring that provides a continuously variable spring deformation rate including a soft spring rate and a hard spring rate by way of an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion having radii not equal to the first radius, but also fails to teach a system in which a load plate mounted beneath said main leaf spring gradually engages the main leaf spring.

Accordingly, Applicants request that the Examiner withdraw this rejection of claim 31.

d. Dependent Claims 2, 4, 5, 7, and 10

Dependent claims 2, 4, 5, 6, and 10 were also rejected as being anticipated by Nickel. These claims all depend, directly or indirectly, on claim 1. Therefore, claims 2, 4, 5, 7 and 10 should be allowed for at least the same reasons as set forth for the independent claim 1.

Accordingly, Applicants request that the Examiner withdraw the rejections of dependent claims 2, 4, 5, 7, and 10.

e. Dependent Claims 13, 15, 16, 18, and 20

Dependent claims 13, 15, 16, and 20 were also rejected as being anticipated by Nickel. These claims depend on claim 12. Therefore, the claims should be allowed for at least the same reasons as set forth for the independent claim 12.

Accordingly, Applicants request that the Examiner withdraw the rejections of dependent claims 2, 4, 5, 7, and 10.

f. Dependent Claims 32 and 33

Finally, dependent claims 32 and 33 were rejected as being anticipated by Nickel. These claims are dependent on claim 31 and should be allowed for the reasons articulated for claim 32.

Therefore, Applicants respectfully request that claims 32 and 33 be allowed.

V. 35 U.S.C. § 103(a)

a. Independent Claim 1

Claim 1 was additionally rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 4,345,749 ("Hellwig") in view of Nickel. As stated above, independent claim 1 relates to a variable rate multi-arc leaf spring. The assembly includes a main leaf spring that is constructed of a composite material. The main leaf spring defines an upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to said first radius. The main leaf spring provides a continuous variable spring deformation rate including a soft spring rate and a hard spring rate.

Neither Hellwig nor Nickel discloses the element that defines an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius; therefore the combination of these two references fails to disclose the element.

Moreover, one of ordinary skill in the art would not be motivated to combine Hellwig and Nickel to provide a main leaf spring that provides a continuously variable spring deformation rate including a soft spring rate and a hard spring rate by way of an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius.

Furthermore, even if Hellwig and Nickel are combined, it would not be obvious to one of ordinary skill in the art to add an upwardly curved central arc portion having a first radius and a pair of upwardly curved central arc portions extending from the central arc portion and having radii not equal to the first radius to achieve a continuously variable spring deformation rate.

Hellwig discloses a splint to repair a broken leaf element of a spring leaf assembly. (Col. 1, ll. 30-33). The splint, as disclosed in Figure 6, contains a convex surface. (Col. 3, ll. 5-7). Additionally, the splint contains recesses 32, which "serve to position crossbars 34 of the securement members 12 so that the splint member is securely held in assembly with the leaf assembly." (Col. 3, ll. 37-41).

Hellwig, however, does not suggest that the disclosed recesses achieve a continuous variable spring deformation rate including a soft spring rate and a hard spring rate. The recesses serve the purpose of holding the splint in the appropriate position. (Col. 3, ll. 37-41).

As discussed above, Nickel does not disclose the invention of claim 1. More specifically, Nickel fails to disclose a main leaf spring providing a continuous variable spring deformation rate including a soft spring rate and a hard spring rate. Nickel discloses only a duel rate leaf spring.

Therefore, the Applicants respectfully submit that there is nothing in Hellwig or Nickel to suggest that it would be desirable to make a main leaf spring defining an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius, wherein the main lead spring provides a continuous variable spring deformation rate including a soft spring rate and a hard spring rate.

Accordingly, Applicants request that the Examiner withdraw this rejection of claim 1.

b. Independent Claim 12

The Examiner also rejected claim 12 under 35 U.S.C. 103(a) as being unpatentable over Hellwig in view of Nickel. Independent claim 12 describes an assembly including a main leaf spring that is constructed of a composite material. The assembly further includes a load plate mounted beneath the main spring during a predetermined set of payload conditions to enhance the soft spring rate of the main spring. The main leaf spring defines an upwardly curved central arc portion having a first radius and at least one pair of upwardly curved peripheral arc portions extending from the center arc portion and having radii not equal to the first radius when no load is applied. However, when a load is applied, the main leaf spring provides a continuous variable spring deformation rate including a soft spring rate and a hard spring rate. Additionally, the load plate further enhances the soft spring rate.

As described above, Hellwig and Nickel do not disclose the element that defines an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius. Therefore the combination of these two references fails to disclose every element of claim 12.

Furthermore, one of ordinary skill in the art would not be motivated to combine these references to provide a main leaf spring that provides a continuously variable spring deformation rate including a soft spring rate and a hard spring rate by way of an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius.

Moreover, even if Hellwig and Nickel are combined, it would not be obvious to one of ordinary skill in the art to add an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius to provide a continuously variable spring deformation rate including a soft spring rate and a hard spring rate. Additionally, it would not be obvious to add a load plate that gradually engages the main spring leaf to enhance the soft spring rate.

As described above, Hellwig describes a splint in which recesses 32 "serve to position crossbars 34 of the securement members 12 so that the splint member is securely held in assembly with the leaf assembly." (Col. 3, ll. 37-41). Hellwig does not suggest that the disclosed recesses achieve a continuous variable spring deformation rate including a soft spring rate and a hard spring rate, nor does Hellwig suggest a load plate to enhance the soft spring rate.

Furthermore, Nickel fails to disclose a main leaf spring providing a continuous variable spring deformation rate including a soft spring rate and a hard spring rate. Nickel discloses only a duel rate leaf spring.

Therefore, the Applicants reiterate that Hellwig or Nickel do not suggest that it would be desirable to make a main leaf spring defining an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius, wherein the main lead spring provides a continuous variable spring deformation rate including a soft spring rate and a hard spring rate.

Accordingly, Applicants request that the Examiner withdraw this rejection of independent claim 12.

c. Independent Claim 31

Independent claim 31 was rejected as being obvious over Hellwig in view of Nickel. As described above, claim 31 relates to the method of achieving a continuous non-linear variable spring deformation rate for a multi-arc leaf spring assembly. The method includes the steps of providing a main leaf spring defining a central arc portion having a first radius and at least one pair of upwardly curved peripheral arc portions having radii not equal to said first radius; providing a load plate below the main leaf spring; applying a downward force to said main leaf spring, wherein said central arc portion flexes and gradually engages the load plate to achieve a soft spring rate; and apply an increased downward force to the main spring leaf, wherein the central arc portion engages the whole load plate and achieve a hard spring rate with a continuous transition between the soft and hard rates.

The combination of Hellwig and Nickel fails to disclose a method of achieving a continuous non-linear variable spring deformation rate for a multi-arc leaf spring assembly as claimed in claim 31.

Moreover one of ordinary skill in the art would not be motivated to combine Hellwig and Nickel to provide a method of achieving a continuous non-linear variable spring deformation rate for a multi-arc leaf spring assembly as claimed in claim 31. Furthermore, even if Hellwig and Nickel were combined, one of ordinary skill in the art would not be inclined to add the steps of providing a main leaf spring defining a central arc portion having a first radius and at least one pair of upwardly curved peripheral arc portions having radii not equal to said first radius; providing a load plate below the main leaf spring; and applying a downward force to said main leaf spring, wherein said central arc portion flexes and gradually engages the load plate to achieve a soft spring rate.

As stated above, Hellwig discloses a splint to be used with broken leaf elements. The splint does include recesses, but these recesses are used to keep the splint in place, not to achieve a continuous variable spring deformation rate.

Furrthermore, Nickel only discloses an apparatus to achieve two discrete deformation rates. As a result, Nickel does not disclose a main leaf spring that provides a continuous variable spring deformation rate including a soft spring rate and a hard spring rate.

Therefore, Applicants respectfully submit that there is nothing in Hellwig or Nickel to suggest that it would be desirable to have a method of achieving a continuous non-linear variable spring deformation rate for a multi-arc leaf spring assembly as claimed in claim 31.

As a result, Applicants respectfully request that the rejection of claim 31 be withdrawn.

d. Dependent Claims 2, 4, 7, and 10

The Examiner rejected claim 2, 4, 7, and 10 as being obvious over Hellwig in view of Nickel. These claims are dependent on claim 1 and only add additional structure to the independent claim. Therefore, the claims should be allowed for at least the reasons stated for claim 1.

Therefore, Applicants respectfully request that the Examiner withdraw the rejections of claim 2, 4, 7, and 10.

e. Dependent Claim 6

Claim 6 was rejected under 35 U.S.C. 103(a) as being unpatentable over Nickel in view of U.S. Pat. No. 3,904,300 ("Hetmann"). Claim 6 is dependent on claim 5, which is dependent on claim 4, which is further dependent on claim 1. As a result, claim 5 incorporates all of the elements of claims 5, 4, and 1. Therefore, claim 6 discloses a variable rate multi-arc leaf spring assembly comprising a main leaf providing a continuous non-linear spring deformation rate including at least one integral mounting end connected with said at least one peripheral arc portion. The at least one integral mounting end further comprises a mounting eyelet including a metallic insert for installation.

Neither Nickel nor Hetmann discloses the element that defines an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius, therefore the combination of these two references fails to disclose the element.

Furthermore, one of ordinary skill in the art would not be motivated to combine Nickel and Hetmann to provide a main leaf spring that provides a continuously variable spring deformation rate including a soft spring rate and a hard spring rate by way of an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius and further containing an integral mounting end comprising a mounting eyelet including a metal insert.

Additionally, even if Nickel and Hetmann were combined, it would not be obvious to a person of ordinary skill in the art to add an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius to achieve a continuous variable spring deformation rate.

Hetmann discloses an elastic joint for use with steering linkages. (Col. 1, ll. 7-13). The joint comprises a joint eye 1 which is rigid. The joint contains an elastic bushing and a metal insert. (Col. 3, ll. 48-53). The joint is designed to place minimal stress on the major axis during the transmission of steering forces. (Col. 4, ll. 27-29).

Hetmann, like Nickel, fails to disclose the element that defines an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius, therefore the combination of these two references fails to disclose the element.

Furthermore, there is no suggestion to combine Hetmann with Nickel. Hetman is specifically designed to be used with steering linkages. Conversely, Nickel does relate to

linkages, but to suspensions. As a result, one of ordinary skill in the art would not be motivated to combine these two references.

Accordingly, Applicants respectfully request that the Examiner withdraw the rejection of claim 6.

f. Dependent Claims 3 and 9

The Examiner rejected claims 3 and 9 under 35 U.S.C. § 103(a) as being unpatentable over Hellwig in view of Nickel. The Examiner further rejected the claims under 103(a) as being unpatentable over Nickel. Claim 3 is directly dependent on claim 1. Similarly claim 9 is dependent on claim 7, which is further dependent on claim 1. As a result, claims 3 and 9 contain the elements of claim 1. Therefore, the claims should be allowed for the reasons stated for claim 1.

Furthermore, Nickel does not suggest that the cross section of the main leaf spring should be uniform. To the contrary, Nickel, in Figure 1, demonstrates that the cross section of the spring 1 increases in proximity to the clamping mechanism 3. Therefore, a uniform cross section is not suggested by Nickel.

Applicants respectfully request that the Examiner withdraw the rejections of claim 3 and 9.

g. Dependent Claim 11

The Examiner rejected claim 11 as being unpatentable over Nickel in view of U.S. Pat. No. 4,801,129 ("Wells"). Claim 11 is dependent on claim 10, which is further dependent on claim 7. Claim 7 is dependent on claim 1. As a result, claim 11 discloses a variable rate multi-arc leaf spring. The assembly includes a main leaf spring that is

constructed of a composite material. The main leaf spring defines an upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to said first radius. The main leaf spring provides a continuous variable spring deformation rate including a soft spring rate and a hard spring rate. The assembly further comprises a load plate adjacent to said leaf spring, wherein said load plate continuously engages said leaf spring during a predetermined set of payload conditions. The assembly also contains an intermediary member spaced between the leaf spring and the load plate constructed of urethane.

Neither Nickel nor Wells discloses the element that defines an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius, therefore the combination of these two references fails to disclose the element. Furthermore, it would not be obvious to one of ordinary skill in the art to add the element to the combination.

Moreover, one of ordinary skill in the art would not be motivated to combine Nickel and Wells to provide a main leaf spring that provides a continuously variable spring deformation rate including a soft spring rate and a hard spring rate by way of an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius.

As discussed above, Nickel does not disclose the invention of claim 1, upon which claim 11 is based. More specifically, Nickel fails to disclose a main leaf spring providing a continuous variable spring deformation rate including a soft spring rate and a hard spring rate. Nickel discloses only a duel rate leaf spring.

Wells discloses a leaf spring clamp for securing the position of a leaf spring in a suspension system, including an upper member or clamp base 30 and a lower member or clamp plate 40 for sandwiching a leaf spring between them. (Col. 1, ll. 6-7; Col. 5, ll. 1-4). Wells neither discloses nor suggests modifying Nickel to include a main leaf spring defining an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius, wherein the main leaf spring provides a continuous variable spring deformation rate including a soft spring rate and a hard spring rate.

Additionally, Wells does not suggest or disclose a load plate mounted beneath the main leaf spring, wherein the load plate gradually engages the main leaf spring during a predetermined set of payload conditions to enhance soft spring rate.

Therefore, Applicants respectfully submit that there is nothing in Nickel or Wells to suggest that it would be desirable to make a main leaf spring defining an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius, wherein the main lead spring provides a continuous variable spring deformation rate including a soft spring rate and a hard spring rate. Furthermore, the references fail to describe s load plate which gradually engages the main leaf spring and enhances the soft spring rate.

Accordingly, Applicants request that the Examiner withdraw this rejection of dependent claim 11.

h. Dependent Claims 13, 15, 20

The Examiner rejected claims 13, 15, and 20 as obvious over Hellwig in view of Nickel. These three claims are dependent on claim 12 and should be allowed for at least the reasons stated for claim 12.

Therefore, Applicants respectfully request that claims 13, 15, and 20 be allowed.

i. Dependent Claims 14 and 19

The Examiner rejected claims 14 and 19 under 35 U.S.C. § 103(a) as being unpatentable over Hellwig in view of Nickel. The Examiner further rejected the claims under 103(a) as being unpatentable over Nickel. Both claims 14 and 19 are directly dependent on claim 12. As a result, claims 3 and 9 contain the elements of claim 12. Therefore, the claims should be allowed for the reasons stated for claim 12.

Furthermore, as explained for claims 3 and 9, Nickel, in Figure 1, demonstrates that the cross section of the spring 1 increases in proximity to the clamping mechanism 3. Therefore, a uniform cross section is not suggested by Nickel.

As a result, Applicants respectfully request that the Examiner withdraw the rejections of claim 14 and 19.

j. Dependent Claim 17

The Examiner rejected dependent claim 17 as being obvious over Nickel in view of Hetmann. Claim 17 is dependent on claim 16. Claim 16 is further dependent on claim 15, which depends on claim 12. As a result, claim 17 contains all the elements of claims 12, 15, and 16. Claim 17 describes an assembly including a main leaf spring that is

constructed of a composite material. The assembly further includes a load plate mounted beneath the main spring during a predetermined set of payload conditions to enhance the soft spring rate of the main spring. The main leaf spring defines an upwardly curved central arc portion having a first radius and at least one pair of upwardly curved peripheral arc portions extending from the center arc portion and having radii not equal to the first radius when no load is applied. However, when a load is applied, the main leaf spring provides a continuous variable spring deformation rate including a soft spring rate and a hard spring rate. Furthermore, claim 17 discloses that the main leaf spring includes a mounting end connected with the at least one peripheral arc portion and the loading structure. In addition, claim 17 discloses that the integral mounting end comprise a mounting eyelet including a metallic insert for installation.

As explained for claim 6, neither Nickel nor Hetmann discloses the element that defines an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius, therefore the combination of these two references fails to disclose the element. Furthermore, one of ordinary skill in the art would not find it obvious to add the element to the combination.

Moreover, one of ordinary skill in the art would not be motivated to combine Nickel and Hetmann to provide a main leaf spring that provides a continuously variable spring deformation rate including a soft spring rate and a hard spring rate by way of an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius

and further containing an integral mounting end comprising a mounting eyelet including a metal insert.

Accordingly, Applicants respectfully request that the Examiner withdraw this rejection.

k. Dependent Claim 21

The Examiner rejected claim 21 as being obvious over Nickel in light of Wells. Claim 21 is dependent on claim 20, which is further dependent on claim 12. As a result claim 21, discloses a variable rate multi-arc leaf spring assembly. The assembly includes a main leaf spring that is constructed of a composite material. The main leaf spring defines an upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to said first radius. The main leaf spring provides a continuous variable spring deformation rate including a soft spring rate and a hard spring rate. The assembly also comprises a load plate adjacent to said leaf spring, wherein said load plate continuously engages said leaf spring during a predetermined set of payload conditions. The assembly also contains an intermediary member spaced between the leaf spring and the load plate constructed of urethane.

Neither Nickel nor Wells discloses the method of achieving a continuous non-linear variable spring deformation rate for a multi-arc leaf spring assembly utilizing a main leaf spring and a load plate. Therefore, the combination of Nickel and Wells is also missing a method of achieving a continuous non-linear variable spring deformation rate for a multi-arc leaf spring assembly utilizing a main leaf spring and a load plate.

Moreover, one of ordinary skill in the art would not be motivated to combine Nickel and Wells to provide a method of achieving a continuous non-linear variable spring deformation rate for a multi-arc leaf spring assembly utilizing a main leaf spring and a load plate. Furthermore, it would not be obvious to one of ordinary skill in the art to add a continuous non-linear variable spring deformation rate for a multi-arc leaf spring assembly utilizing a main leaf spring and a load plate to the combination

As discussed above, Nickel does not disclose the invention of claim 31. More specifically, Nickel fails to disclose a main leaf spring providing a continuous variable spring deformation rate including a soft spring rate and a hard spring rate. Nickel discloses only a duel rate leaf spring.

Furthermore, as discussed for claim 11, Wells discloses a lead spring clamp for securing the position of a leaf spring in a suspension system, including an upper member or clamp base 30 and a lower member or clamp plate 40 for sandwiching a leaf spring between them. (Col. 1, ll. 6-7; Col. 5, ll. 1-4). However, Wells does neither discloses nor suggests a main leaf spring providing a continuous variable spring deformation rate including a soft spring rate and a hard spring rate or a load plate mounted beneath the main leaf spring, wherein the load plate gradually engages the main leaf spring during a predetermined set of payload conditions to enhance soft spring rate.

Therefore, Applicants respectfully submit that there is nothing in Nickel or Wells to suggest that it would be desirable to make a main leaf spring defining an upwardly curved central arc portion having a first radius and a pair of upwardly curved peripheral arc portions extending from the central arc portion and having radii not equal to the first radius,

wherein the main lead spring provides a continuous variable spring deformation rate including a soft spring rate and a hard spring rate.

Accordingly, Applicants request that the Examiner withdraw this rejection of dependent claim 21.

I. Dependent Claim 32

The Examiner rejected claim 32 as obvious over Hellwig in view of Nickel. This claim is dependent on claim 31 and should be allowed for at least the reasons stated for claim 31.

Therefore, Applicants respectfully request that claim 32 be allowed.

SUMMARY

Each of the rejections in the Office action dated May 30, 2003 have been addressed and no new matter has been added. Applicants submit that all of the pending claims are in condition for allowance and notice to this effect is respectfully requested. The Examiner is invited to contact the undersigned attorneys for the Applicants via telephone if such communication would expedite this application.

Respectfully submitted,

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